AGRICULTURAL NEWS LETTER

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This publication contains information regarding new developments of interest to agriculture based on laboratory and field investigations of the du Pont Company and its subsidiary companies. It also contains published reports and direct contributions of investigators of agricultural experiment stations and other institutions as related to the Company's products and other subjects of agricultural interest.

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SOIL CONSERVATION HELPS PROTECT WILDLIFE

Soil conservation, designed primarily to benefit farm land itself, also helps protect and conserve desirable wildlife in rural areas.

The U. S. Department of Agriculture's program for conservation of the natural resources of farm lands includes such devices as field and farmstead windbreaks, farm ponds, grass buffer strips, and grassed drainage ways -- all of which also promote the production and maintenance of wildlife.

Abundance of Game Depends on Food and Cover

The relative abundance of farm game, such as pheasants, quail, and rabbits, depends largely on the amount and distribution of food and cover within their ranges.

Field windbreaks not only aid in controlling wind erosion and conserving moisture in unprotected fields, but directly benefit wildlife because such protective screens offer a large amount of cover and, being in cropland, afford abundant winter food. The farmstead windbreak, usually trees and shrubs, not only protects the farmyard, but provides fruits and other food for both the farm family and the wildlife of the neighborhood. Game birds will use both types of windbreaks to protect themselves from winter cold.

Farm ponds, fenced for protection against livestock, afford abundant cover for wildlife close to a supply of open water, and are particularly useful during periods of drought. Waterfowl, of course, often frequent such farm ponds.

Grassed buffer strips, usually used with strip cropping on sloping fields, retard the erosive force of run-off water, and produce considerable hay which wildlife can use as nesting cover. Such buffer strips also serve as travel lanes through farm fields, facilitating the movement of game, particularly of birds.

Grass drainage ways provide a means for run-off water to leave the lands without cutting severe gullies, and also produce a good crop of hay each year. Here again, nesting areas and travel lanes are made available to wildlife.

Farmers who practice soil and wildlife conservation in these and similar ways must supplement their efforts by controlling predatory animals. They must also take care not to destroy the nests of pheasants and other game fowl by early mowing of fields, and they should restock their lands from game farms whenever possible.

Wildlife Furnishes Recreation and Food

While some farmers complain of the damage done to crops by birds and game, conservationists point out that wildlife can be of real value, furnishing many farm families with recreation and a variety of tasty and nutritive foods -- especially important in these days of food rationing. In addition, wildlife, particularly birds, reduces the populations of destructive insects.

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WHAT TWO SCIENTISTS, IN RECENT RADIO TALKS, HAD TO SAY ABOUT RESEARCH

"AGRICULTURAL RESEARCH IS HELPING WIN THE WAR" -- SECRETARY WICKARD

Results of agricultural research -- both past and present -- "are giving our country greater productive strength and helping win the war," according to Secretary of Agriculture Claude Wickard.

In a national Farm and Home Hour radio address, Secretary Wickard cited recent research which led to the development and use of a mixture of phenothiazine and salt for voluntary consumption by livestock for control of nodular worms as an example of the kind of scientific information of special importance in wartime.

The Secretary said he hoped sheep raisers have seen the small exhibits that have been distributed by the U.S. Agricultural Extension Service on the control of nodular worms.

"Keeping these worms in check results in better growth of lambs, better fleeces, and better shearling pelts for the suits of our fighting fliers," Mr. Wickard said. "It also insures the production of sound, normal intestines, from which surgical thread for stitching wounds is made."

U.S. D.A. Finds Phenothiazine Especially Effective Against Nodular Worms

The Secretary added: "The Department has found phenothiazine to be especially effective against nodular worms. One of the latest developments in the use of this drug is the practice of mixing it with salt in the proper proportion so the sheep on pasture or range can dose themselves."

Mr. Wickard said scientific research is proving its value over and over again in showing how to get the most out of our productive facilities.

Research Develops Reservoir of Knowledge For Agriculture

"One of the long-range jobs of the Department of Agriculture, through the years, has been to find out how to increase farm efficiency," he said. "This objective, along with soil conservation, has challenged the best efforts of our scientists, engineers, and other research workers. Their discoveries -- the new practices and processes and techniques they have developed -- stand today as a great reservoir of practical knowledge on which the farmers of the Nation can draw."

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"AGRICULTURAL RESEARCH MUST GO FORWARD AFTER THE WAR" -- W. H. Tisdale

The peoples of the world may eventually be assured against want of food through still better methods of dehydration, canning, compression, refrigeration and cold storage, which are in the offing, together with better production and distribution facilities.

Such was the statement made by Dr. W. H. Tisdale, Director of the Du Pont Pest Control Research Laboratory, Wilmington, Delaware, in a radio address on the "Adventures in Science" program, sponsored by Science Service.

"Food is one of the most vital problems confronting the world today," said Dr. Tisdale, in emphasizing the importance of agricultural research in the post-war period. "Agriculture is our chief source of food and many other necessities of life. Progress in agriculture has its foundation in research. No higher tribute can be paid to our farmers and to our agricultural research institutions than to point to the large surpluses of many agricultural products on hand when war was declared.

"The ever-increasing needs in this struggle for existence have already reduced many of the surpluses to the vanishing point. Even America, a traditional land of plenty, is being faced with serious shortages of food and other agricultural products. This situation threatens to become even more acute. Abnormal weather will reduce yields, and immediately after the war we must help feed the hungry people who survive the heels of their Axis conquerors."

Research In Other Sciences Must Keep Pace

Dr. Tisdale said that, after the war, agricultural research in America must go forward with renewed vigor to expand and build on the firm foundations which have served as the basis for prosperity in the past. "Research in other sciences," he said, "must keep pace with research in agriculture. In fact, there is no sharp line of demarcation between the so-called agricultural sciences and sciences such as chemistry, physics, engineering and mathematics. Many of the fundamental basic principles underlying advances in agriculture are products of the discoveries of other sciences, and much that is accomplished through agricultural research is of value to other sciences."

Since the declaration of war many meritorious investigations have been curtailed or discontinued, said Dr. Tisdale. "Special consideration is rightfully being given to problems of urgent necessity in the war effort. But with the coming of peace our agricultural research programs will be restored," he said.

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Agricultural Colleges Must Provide Many Trained Research Men

"Many trained research men," he said, "will return from the front and will be available to take their places in a more permanent order. In spite of this, there will be a shortage of trained research men which must be met by special efforts on the part of our agricultural colleges and universities."

In speaking of the accomplishments of agricultural research, Dr. Tisdale said that we must not only exercise constant vigilance to maintain our peace-time gains, but that we must and will go forward on many fronts.

"Improved soil care and handling, and the development of better fertilizer formulations, will result in greater yields of plant products of high quality. Plant breeding must be expanded to increase the number of varieties and strains of fruit, field crops and vegetables, representing better quality, higher yields, and resistance to disease, insects, drought, and frost. The knowledge of vitamins and hormones or growth-promoting substances is limited. More thought and extensive research in this field will yield valuable results."

Youth Must Be Taught To Appreciate Advantages of Farm Life

Dr. Tisdale stressed that better methods must be sought for teaching the youth of the future to appreciate the advantages of agriculture and of farm life.

"Following the war," he said, "our agricultural research planning must be sufficiently broad and inclusive to insure our own security and comforts beyond anything we have yet known, and to provide the much-needed cooperation in a world-wide program of research designed to establish a more universal security and, we hope, a more permanent peace."

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NEW UREA-SULFUR MIXTURE REDUCES POULTRY LOSSES FROM COCCIDIOSIS

Chemical research again steps forward to help increase the wartime food supply for our armed forces and civilian population.

An inexpensive new poultry medicine consisting of a mixture of equal parts of synthetic urea and microfine sulfur, in carefully controlled experiments, saved two out of three birds that normally would have died from coccidiosis, the dread disease that kills an estimated 100,000,000 chicks in this country every year.

Even mild attacks of this ailment lower the meat-producing and egg-laying efficiency of the chickens that live. It is one of the most common producers of unprofitable culls.

As pointed out by Dr. H. M. DeVolt, poultry pathologist at the Maryland Agricultural Experiment Station, "while various drugs appear to be helpful in certain cases, there is not, at present, an officially recognized cure for the disease, largely because of the difficulty of bringing the chickens under a practical and economical system of medicinal treatment."

Treatments Reduce Deaths of Infected Birds 70%

However, Dr. Paul D. Harwood, formerly of the U. S. Bureau of Animal Industry and now research director for Dr. Hess and Clark, Inc., of Ashland, Ohio, says the new urea-sulfur mixture, known as "Coxitrol," reduced the death losses of infected birds by more than two-thirds. He adds that from 80 to 90 per cent of the untreated birds died from the experimental infection.

The untreated birds surviving suffered a much greater setback than the treated fowls. Tests conducted by other investigators, and available to Dr. Harwood, indicate that chicks kept on the medicated mash from the time they were two weeks old until maturity, developed as rapidly and laid as many eggs as similar chicks on normal diet. The treatment was found to cost less than one cent per chick, according to Dr. Harwood.

Coccidiosis, which is particularly prevalent during warm, rainy weather, is caused by a small single-celled parasite called a coccidium, which is swallowed with feed or water. After reaching the digestive tract, the shell of the intruder breaks, liberating little cigar-shaped wrigglers that burrow into the wall of the intestine, causing injury, inflammation, and illness.

To combat the disease, Dr. Harwood advises the poultry raiser to add one pound of the new chemical mixture to 100 pounds of mash to be fed continuously for two weeks. Flocks already infested require two pounds of the medicine per 100 pounds of mash, fed for 14 consecutive days, with seven days on regular mash, followed by seven days of the mash containing 2 per cent of the "Coxitrol."

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FORMALDEHYDE ON THE FARM AND IN THE HOME

Formaldehyde has numerous uses on the farm and in the home as a disinfectant, fungicide, germicide, and deodorant to control disease germs, mold, and musty or offensive odors.

It is used to promote cleanliness and sanitation, to safeguard health of human beings and livestock, and to protect crops against soil- and seed-borne diseases.

As used in diluted form as a disinfectant and deodorant, it does not endanger animal life, and does not injure silks, linens, cottons, woolens, furniture, household utensils, or farm implements.

Scrubbing or spraying cellars, refrigerators, cupboards, sinks, storerooms, rooms where there has been sickness, stables, pigpens, chicken coops, poultry runs, pigeon lofts, feeding troughs, dog kennels, and out-houses with a solution of formaldehyde helps keep them clean and healthful.

Small areas may be disinfected and offensive odors may be kept down by spraying. Formaldehyde is used in whitewash applied to structures to arrest decay, kill odors, and keep the premises sanitary.

Controls Important Plant Diseases

Formaldehyde is an efficient control for such plant diseases as grain smut, which causes an estimated loss of 25,000,000 bushels of wheat and another 25,000,000 of oats annually in this country. Treatment of grain seed with formaldehyde by sprinkling, dipping, or spraying, in addition to saving smutted grains, usually increases acre yields, probably because other seed-borne diseases are also checked.

Many seed potatoes are infected with diseases which cut down stands, injure roots, cripple the potatoes, and reduce yields. Such potatoes can often be made into good seed potatoes by treating with formaldehyde to control common scab, black scurf or rhizoctonia.

The soil in hot beds for vegetable and other crops is often disinfected by drenching with formaldehyde solution 10 days to two weeks before planting.

Fumigation by thorough spraying of mushroom houses, the ground about them, composting yard, and beds is usually recommended to control Bubbles disease of mushrooms.

Application of formaldehyde solution in the row with seed controls onion smut, which kills young seedlings in the Spring.

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Storage-rots, smudge, neck-rot, soft-rot, and black-mold are controlled by protecting the crop from moisture during and after harvest and by curing the onions rapidly and thoroughly. Spraying of racks, crates, bins, floors, and walls with strong formaldehyde solution is helpful.

Formaldehyde is used to treat the soil for control of damping-off fungi, cucumber root-rot, lettuce rosette and rot, tobacco-bed rot, and root-knot which is caused by small worms or nematodes. Ten days to two weeks before planting, the soil should be drenched with a solution of formaldehyde for a great variety of crops, including asparagus, artichoke, beet, beans, celery, eggplant, fescue, ginseng, garden peas, kale, lettuce, leek, lima beans, mustard, muskmelon, okra, onion, oyster plant, pineapple, sweet potato, peanut, pumpkin, parsnip, parsley, potato, rutabaga, red pepper, radish, squash, spinach, turnip, tomato, tobacco, watermelon, gourd, and yam.

NOTE: A printed folder giving directions for use of formaldehyde on the farm and in the home will be sent on request to the Editor, Du Pont "Agricultural News Letter," Wilmington 98, Delaware.

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"ARASAN" SEED DISINFECTANT AND SULFUR DUST INCREASE PEANUT YIELDS

"Arasan" seed disinfectant, the new tetramethyl thiuramdisulfide compound, "seems at present to be one of the safest and most efficient chemicals to use on peanut seed," according to a "Food for Victory" bulletin issued by S. A. Wingard, Plant Pathologist, Virginia Agricultural Experiment Station, Blacksburg.

Discussing various ways to increase peanut yields, Professor Wingard recommends seed treatment and, later, sulfur dusting of the plants in the field. He quotes experimental data showing that "Arasan" gave excellent results in Georgia, North Carolina, and Virginia. He adds: "It is felt that Virginia growers should use this material in preference to others."

He says that 2% "Ceresan" seed disinfectant, which has been tried for a longer time than "Arasan", is known to be highly effective, but he cautions that overdosage and dry soil conditions must be avoided if "Ceresan" is used.

The Virginia plant pathologist points out that seed treatment, at a cost of 15 to 20 cents for material to treat 100 pounds of seed, prevents seed rot and usually gives a considerable increase in the stand of plants and yield of crop.

Sulfur dusting of the plants in the field, at a cost of about $3 to $4 per acre for materials, will control leaf-spot and leaf-hopper, and thereby further increase the yield of nuts by about 25 per cent and of hay by 30 to 40 per cent, he states.

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NAPHTHALENE ACETIC ACID DUST RETARDS "BLOSSOM DROP" OF WAX BEANS

Increases in the yields of wax beans dusted with naphthalene acetic acid in experiments in Wisconsin last year were probably due to the effect of the hormone in preventing "blossom drop."

This is the guarded conclusion drawn from an analysis of the results of the tests by Drs. T. C. Allen and Ellsworth Fisher of the Wisconsin Agricultural Experiment Station. They caution, however, that the trials were preliminary, and that further work is underway to determine whether such dusts will give consistently good results.

The successful use of hormones, particularly of naphthalene acetic acid, in retarding the dropping of apples and pears just prior to harvest, suggested the possibility of using naphthalene acetic acid to prevent "blossom drop" of canning beans in Northwestern Wisconsin.

Analysis of Results

The experiments, conducted in cooperation with Stokely Brothers and Company, are summarized in Table 1. An analysis of the data shows that the increased yield from the dust treatments to wax beans is significant, according to the Wisconsin entomologists. The results with dusts on Refugee beans had little if any significance; while the sprays, as used, appeared to have no advantage on either variety.

The addition of pyrethrum and rotenone, used for control of various insects inhabiting the bean plantings, did not impair the activity of the naphthalene acetic acid.

The increased yield from the dusted wax bean plants contained a larger percentage of the small high-quality pods than that from the untreated controls. Apparently the increase in weight came from a larger number of the small pods rather than an increase in size. This, according to Drs. Allen and Fisher, suggests (1) that conditions were favorable for blossom drop when the dust was applied to the wax beans, (2) that a number of the blossoms were prevented by the hormone from falling, and (3) that the competition between a number of small pods reduced the percentage of those able to attain a large size.

Dusts and Sprays Used

Dust preparations were made to contain respectively 2½ and 5 parts per million of naphthalene acetic acid in Pyrax talc. One dust preparation contained not only 5 p.p.m. naphthalene acetic acid, but also the rotenone and pyrethrum insecticides.

The sprays were prepared so as to contain three different concentrations of naphthalene acetic acid, 2½, 5, and 7½ p.p.m. To a spray containing 5 p.p.m. naphthalene acetic acid, rotenone and pyrethrum were added. A spreading agent was employed in all sprays.

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Method of Application

The dust and spray tests were made on wax beans at Earl, Wisconsin, and on Refugee beans at Cumberland, Wisconsin. A single treatment consisted of four rows of beans, each row fifteen feet long, making a total of 240 feet of row in the four replicates of each treatment and each check. The dust and spray treatments and untreated check were randomized in each of four replicated plantings.

The dusts were applied at about 30 pounds per acre to bean foliage by a hand-operated rotary duster. The sprays were applied at 150 pounds pressure with a barrel sprayer at approximately 125 gallons per acre.

Wax Beans

Two applications of dusts and sprays were made during early blossoming period. The first application to wax beans was made July 17, 1942, between 7 and 9 p.m. During application there was high humidity, no wind, and a temperature of 85°F. Lower blossoms on the plants were well opened, while buds on the upper stems were still closed but well developed. A heavy rain occurred after 24 hours. The second application to wax beans was made July 24 between 7 and 9 p.m. At this time there was very little wind and a temperature of 72°F. Small beans were forming on the lower portions of the plants and well developed blossoms occurred on the terminal portion of the stem. Rain fell after eight hours.

Refugee Beans

As the Refugee is a later variety of beans, the first application of dusts and sprays was made July 22 between 11 a.m. and 1 p.m. There was some wind. The temperature during application was 70°F.--much cooler than during the first applications on wax beans. About one-half of the blossoms were fully developed. Rain fell six hours after application. The second application was made July 30 between 7 and 9 p.m. The weather was like that during the first application, but the plants were older and were forming small beans. Six hours later there was rain.

Method of Taking Yields

Beans were picked five times during the growing season. The yields from each treated and untreated replicate were then placed in separate numbered bags, and later weighed and graded.

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Table 1.--Summary of Increase or Decrease in Yields of Wax and Refugee Beans When Dusted or Sprayed With Naphthalene Acetic Acid

Substance Used	Amount Used	Increase (+) or decrease (-) in comparison with controls: Wax beans Per cent	Refugee beans Per cent
Dusts			
Naphthalene acetic acid.....	5.0 p.p.m.*	+15.6**	+7.6
Naphthalene acetic acid.....	2.5 p.p.m.	+15.2**	+8.3
Naphthalene acetic acid.....	5.0 p.p.m.)		
Rotenone.....	0.5 per cent)	+14.5**	+2.8
Pyrethrins.....	0.2 per cent)		
Sprays			
Naphthalene acetic acid.....	7.5 p.p.m.	+3.4	-4.5
Naphthalene acetic acid.....	5.0 p.p.m.*	+3.9	-12.0
Naphthalene acetic acid.....	2.5 p.p.m.	+0.8	+6.5
Naphthalene acetic acid.....	5.0 p.p.m.)		
Rotenone.....	0.5 per cent)	+7.5	+0.2
Pyrethrins.....	0.2 per cent)		

*5.0 parts per million or .0005 per cent. The controls yielded 2,559 pounds per acre.

**These increases were found statistically significant as a result of the analysis of variance.

NOTE: Naphthalene acetic acid is the active ingredient in Du Pont's "Parmone" Concentrated pre-harvest fruit-drop spray, which contains 4 grams of this synthetic hormone dissolved in 4 fluid ounces or 1/4 pint of a special alcoholic solvent.

"Parmone" dust which contains 0.4 gram of naphthalene acetic acid per pound is being made available by Du Pont this year. One pound of dust will be the equivalent of 10 gallons of "Parmone" spray diluted to contain 10 parts of naphthalene acetic acid per million parts of water (10 p.p.m.) by weight.

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FIVE MILLION POUNDS OF DYNAMITE USED ANNUALLY FOR AGRICULTURAL PURPOSES

Dynamite, the "builder" explosive associated always with constructive progress, has an importance in agriculture far greater than is commonly realized.

While most of the dynamite manufactured in this country is used for industrial construction work, coal and metal mining, and quarrying, about 5,000,000 pounds of this highly mobile and versatile engineering tool are used annually for agricultural purposes.

Some of its uses, such as blasting to stop the spread of forest fires, are of dramatic significance, but most of the accepted uses of dynamite on the farm are for such prosaic functions as ditching, land clearing, drainage, irrigation, stump blasting, road construction in lumber camps, and fruit-tree planting.

Dynamite Makes Ditch Digging Easy

One of the biggest fields for the agricultural use of dynamite is digging ditches. By the propagation method, it is frequently possible to blow a ditch in marshy swampy land much more quickly and more economically than by any other method. One or more cartridges of Ditching Dynamite are placed in holes 18 to 24 inches apart in the line of the desired ditch.

One or two extra cartridges of dynamite are placed in one of the holes, usually about the center, and one of these cartridges is primed with a cap and fuse. When this central hole is fired, the shock of the explosion detonates the charge in holes on each side which, in turn, do likewise to the next ones. The entire line of charges thus explodes at practically the same time. This blows the dirt high into the air and clear of the ditch, leaving it open for the flow of water.

This method is possible only where soil is very wet and free from sand, as sand cushions the shock of the dynamite and prevents transmission of the detonating wave. Where ditches must be made by blasting through dry soil or sand, an electric blasting cap must be placed in each charge, and these caps connected together into an electric circuit and fired by means of a blasting machine. This limits the length of a ditch which can be fired at one time to the capacity of the blasting machine available, whereas ditches up to 1,000 feet in length have been fired with a single cap by the propagation method.

Large Quantities Used to Clear Land of Stumps

Clearing land of stumps in cut-over regions, particularly in the Northwest, has utilized large quantities of dynamite. Most of the cut-over timberland in Wisconsin, Michigan and Minnesota, and in the Pacific Northwest, has been bought by farmers who blast the stumps with dynamite and raise valuable crops.

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In some parts of the South, dynamite is used to blow out the rich resinous stumps of the long-leaf yellow pine. Here the stump, rather than the land, is the valuable commodity. These stumps, rich in rosin and turpentine, are sold to distilleries. Since the operators wish to blow these stumps out in pieces, the charge is placed directly in the woody tap-root of the stump itself, not in the ground under the stump.

Small Charges Aid Root Growth of Young Fruit Trees

Tree planting with dynamite is profitable for orchards in clay soils, according to Du Pont agricultural explosive technicians. Small charges, one-fourth to one-half pound, placed at a depth of about 30 inches, are fired when the ground is dry. This loosens the surrounding soil so thoroughly that when the young tree is planted its root-growth is greatly facilitated, and the tree often comes into bearing a year or two earlier than those planted in holes not so treated.

Dynamite Has Many Other Important Uses of Interest to Farmers

Among many other uses of dynamite of interest to agriculture are settling highway fills over soft and marshy ground, a helpful procedure in the speeding up of the building of modern hard-surfaced roads in swampy sections; blasting holes for posts and poles; sinking wells; shooting deep wells to increase the flow of water; increasing drainage by firing subsoil shots between lines of tile drains; starting log jams and blasting ice gorges to release or prevent floods; exterminating mosquitoes by ditching and draining swamps; and controlling forest fires.

Experimentation In Laboratory and Field Continues

The list of agricultural uses of dynamite grows day by day and so also does our knowledge of explosives and the methods to apply and control their potential energy. Experimentation goes on continually both in the laboratory and the field, and the science of manufacturing and using explosives steadily advances, the Du Pont explosives experts assert.

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HIGHLIGHTS OF NYLON RESEARCH AND DEVELOPMENT

Agriculture at the moment is standing aside to permit utilization of nylon for vital military purposes.

Before the entry of the United States into the war, farmers and the handlers and processors of farm-produced materials had begun to make considerable use of products made of this new chemical wonder. For example, during 1941 a large number of brushes with nylon bristles were being used to wash milk bottles, and for pipe, cooler, and other sanitary cleaning operations in the dairy industry.

By the end of the year, the list of nylon peacetime products used by farm and city people alike included stockings, gloves, girdles, underwear, lingerie, neckties, fishlines and leaders. However, early in 1942 this new synthetic became a top-ranking material for war use. It is going into parachutes, parachute shroud lines, harness straps, belting, and tapered bristles for paint brushes, the latter developed just in time to meet the wartime emergency.

This material can be spun in thicknesses from a fraction of a thousandth of an inch to husky "monofilaments" for brush bristles, sutures, racquet strings, window screens, and fishing leaders. It is applied in solution, and also in molten form, for insulating wire. In granulated form it can be molded into such objects as self-lubricating bearings for machinery. It may also be used to make products resembling leather, sponges, and cork.

Formative Period of Du Pont's New Discovery Was Only About Ten Years

If its progress had followed that of most other inventions, nylon might still be buried in the laboratory. Government studies show that of the major inventions coming into use between 1888 and 1913, the average took 50 years to get from the inventor's workbench to the channels of commerce. By 1930 this interval was shortened to 33 years. But the formative period of Du Pont's new discovery was only about ten years. Actually only three years elapsed between its first show of definite promise as a fiber and the announcement of nylon in the autumn of 1938.

First serious work on chemical materials made up of "giant" molecules started in Du Pont laboratories in 1928. Following announcement of nylon in 1938, market specialists began to study its possible uses and values. One group concentrated on hosiery yarns; another on bristling filaments; a third continued to explore the basic discovery for further uses; and a fourth took up the highly important problem involved in nylon's large-scale production, which was of such a character that the inventive process had to begin all over again.

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Machines had to be designed and developed to manufacture the yarn. This work required much time, resulting first in a small-scale or pilot plant. Knitting problems came next. The fiber had to be adapted to the hosiery industry. This called for further inventions demanding chemical and engineering skill of the highest order.

New Fiber Gained Unique Properties, Previously Unsuspected

In overcoming difficulties that seemed insurmountable for a while, the new hosiery fiber gained unique properties, previously unsuspected. Women were enlisted to make wearing tests of the experimental hosiery. As rapidly as faults in the stockings were reported, technicians hastened to correct them.

Meanwhile, the hosiery industry, working with small lots of the new yarn, had its own technique to develop, operators to train, retailers to educate, new packages and displays to prepare.

Nylon Will Again Be Used For Agricultural Industries

It is fortunate for our war effort that men, equipment, and many millions of dollars were made available by private industry to make possible nylon's transition from an idea to a commercial success in so short a time. Without this large-scale organization, it would probably not have reached the commercial stage until years later.

And, later on, nylon will again come into its own for brush bristles for the dairy and other agricultural industries, for paint-brushes, window screens, rope, stockings and cloth for farm and city folk alike; -- and for all the other known and as yet unknown peace-time uses for which the extraordinary fibers and filaments are so eminently satisfactory.

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GOATS TREATED WITH PHENOTHIAZINE RETURN GREATER PROFITS

Since millions of goats are helpful to the country's war effort in numerous ways, renewed interest is being manifested in the government's health program for these much-abused ruminants. Medical and other journals are devoting considerable space to new information on medicaments for goats, particularly data on the use of phenothiazine for the control of internal parasites.

Goats supply high-quality leather for the shoe, glove, and allied industries. Mohair or goat wool is an important product for upholstery and similar uses. Goat's milk is recognized as of great value as a food, especially for invalids and babies. Goat's meat, too, is recommended by many food experts.

Raising of goats is important in many States. There are 4,318,000 of them in Missouri, Texas, New Mexico, Arizona, Utah, Oregon, and California. They supplied 20,728,000 pounds of mohair last year. This clip, which averaged 4.8 pounds per animal, sold for 49.3 cents per pound or $2.37 per goat, for a total of more than $10,000,000.

Expenditure of a few cents for a vermifuge is therefore considered a good investment, particularly since the treated animals usually return a much greater profit than do those suffering from worm infestation and other ailments.

Phenothiazine has been found to be effective in removing gastro-intestinal nematodes from goats. Since winter is the most effective time to adminster this drug, treatment must usually be given to females when they are pregnant.

For that reason, observations were made during the winter of 1941 and 1942 at the U. S. Research Center at Beltsville, Md., on eight pregnant goats and thirteen kids to determine the effects of this drug on the does, and on their kids, and upon lactation.

U.S.D.A. Conducts Successful Experiments With Pregnant Goats and Their Kids

Dr. Robert T. Habermann of the Bureau of Animal Industry, summarizes the results of these tests, as follows:

"One goat and her kid were uninjured by the daily consumption of 15 grams of phenothiazine mixed in the moistened grain for a period of 12 days. Another goat and her first kid, in an unusual case of superfetation, were not harmfully affected by consuming 15 grams of phenothiazine daily in a moistened grain mixture for 12 days and, following the birth of her second kid, she and her two kids were uninjured by consuming the medicated mixture for 15 additional days.

"The milk from both goats that received 15 grams of the drug daily turned a slight red color when exposed to the air for several hours. However, the presence of phenothiazine or its break-down products in the milk did not inhibit lactation, or produce any deleterious effects in the kids.

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"The weights of the goats and their kids were normal throughout the test. No anemia was found in the mature females, and spectroscopic examinations of their urine for blood were negative.

"Four pregnant goats were uninjured by the administration of two therapeutic doses of phenothiazine, and three pregnant goats and their kids were not affected by three therapeutic doses of the anthelmintic. Twins, born to one of the goats receiving three therapeutic doses of phenothiazine, were found dead, buried in the snow. As both of these kids were full term and well developed, the drug was not considered responsible for their deaths.

"One doe in 1941, and five does in 1942, were given therapeutic doses of phenothiazine within one month of parturition and gave birth to nine normal, healthy kids."

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DIPHENYLAMINE-BENZENE SOLUTION KILLS FLEECE WORMS AND PREVENTS REINFESTATION

A new treatment involving a combination of chemicals that kill the fleece worm larvae and simultaneously protect sheep against reinfestation has been developed by the U.S. Department of Agriculture.

Results of investigations indicate that benzene containing approximately 15 per cent diphenylamine is "an effective and convenient treatment," according to Edward F. Knipling, associate entomologist of the federal laboratory at Portland, Oregon.

Diphenylene oxide and p-nitrophenetole also gave a high degree of protection against reinfestation. Knipling points out, however, that since diphenylamine, either as such or in a smear known as Formula No. 62, is also used to control screwworms, "this chemical would be most practical."

In his experiments, Knipling found only one reinfestation among 33 animals treated with the benzene-diphenylamine solution, and none among animals treated with other combinations.

When mixtures of benzene and diphenylamine or diphenylene oxide solutions containing turkey-red oil were used, no reinfestations occurred.

In addition to tests on artificially induced infestations, 14 natural infestations were treated with the combinations of benzene and diphenylamine or diphenylene oxide, with no reinfestations resulting.

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MOISTURE-PROOF PACKAGING ESSENTIAL TO SUCCESS OF HOME FOOD DEHYDRATING

Adequate protection against moisture is essential for proper packaging and storing of home-dehydrated fruits and vegetables, particularly in humid climates.

This fact is emphasized by A. F. Wendler, Technical Section Manager of Du Pont's Cellophane Division, in a statement aimed at preventing waste of foodstuffs through improper procedures.

Mr. Wendler and his research associates have been conducting experiments in packaging dehydrated foods for several years.

"Every housewife knows that a leaky seal will ruin a jar of canned tomatoes or string beans," he says. "She should be equally aware that a poor container will similarly cause spoilage of many home-dried foods.

"Not all vegetables can be dehydrated successfully. Sweet corn, apples, and parsley and celery (for soup flavoring) can be dehydrated and packaged without much difficulty, if they are properly processed according to instructions issued by the U. S. Department of Agriculture. The amateur dehydrator is confronted with real problems when she tackles the more hygroscopic foods (those which absorb moisture easily). Even the industrial dehydrators, whose business has undergone tremendous expansion during the war, have had to overcome many difficulties in preparing and packaging these products for the Army and for Lend-Lease shipments.

"Carrots and cabbage are among the more troublesome vegetables. They are not only very hygroscopic but oxidize easily. The Army is, therefore, packing them in tin cans immediately after dehydration. During the packing, the air is replaced in the can by an inert gas, nitrogen or carbon dioxide."

Moisture-Proof Cellophane Provides Excellent Protective Package

For the safe storing of most fruits and vegetables dehydrated in the home, a container must be used which has the greatest resistance to passage of moisture vapor.

"Cellophane of the moisture-proof type provides an excellent protective package for dehydrated foods," Mr. Wendler advises. "However, it is not always easy for the consumer to obtain this type of film, at present, due to its great demand for war packaging. It is, therefore, important for the housewife to know the difference between moisture-proof cellophane and the type known to the trade as 'plain transparent,' which is grease-proof but not moisture-proof. The moisture-proof cellophane used for this purpose seals to itself upon application of a hot iron, and this is a simple test. This variety may be purchased at some

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of the stores which sell home-freezing supplies, as it is extensively used in packaging frozen foods. The plain--or non-moisture-proof--film should not be used.

"Where cellophane is used, it is a good idea to place in one bag the amount of dehydrated food needed for one family meal. A number of these bags may be placed in a crock, jar or box with a tight-fitting lid. The food then can be used one bag at a time without exposing the remainder to moisture absorption.

"In the event that the home dehydrator cannot obtain moisture-proof cellophane or other satisfactory moisture-resistant paper type containers she may turn to the traditional home-preserving receptacle, the glass jar, one of the safest and most available containers under present conditions.

All Dehydrated Foods Should Be Packaged Promptly

"In all cases the packaging of dehydrated foods should be done promptly, under sanitary conditions, and out of contact with dust. Containers should be filled to the top in order to displace as much air as possible--to keep down oxidation. Extreme cold will not injure dehydrated foods, since they contain so little water. But prolonged storage in a very warm place will adversely affect them, and light affects some products. Storage in a cool dark dry place is best.

"Home dehydrators should also make sure that the interior of larger pieces of fruit or vegetables is thoroughly dried. Too often one assumes that because the small pieces feel dry the whole batch is sufficiently dehydrated, whereas the larger pieces may be still moist on the inside. Then when all are packaged together the moisture in the large pieces may be given off and cause the whole batch to become moldy.

"The observance of these precautions will help prevent spoilage of home dehydrated foods due to improper dehydration or packaging. As pointed out previously the difficulties confronting the commercial dehydrator are magnified when the housewife tackles the problem."

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